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NOTES ON THE GENUS ACIDASPIS.

By J. M. CLARKE.

Communicated to the State Geologist, December, 1890.

The genus ACIDASPIS, as the term is currently accepted, may be regarded as one of the more compact and homogeneous groups of the trilobites. It may be safely said that it is the pre-eminent influence of the great Barrande, the profoundest student and foremost authority on these fossils, that has brought the name into general usage, though until later years the term proposed by Emmrich, ODONTOPLEURA, has found favor with the German writers.

Conformity to the rules governing nomenclature, which are intended to render justice to every investigator, does not uphold this usage. There is an evident disposition abroad, and one most heartily to be indorsed, to ascertain as far as possible from the descriptions by earlier writers, their intentions. The original diagnoses may have been brief, all too brief to satisfy the present requirements of our science, their illustrations insufficient or faulty, but it will not suffice to reject a name upon these grounds alone. "Too imperfectly described to be identified," is a decree which often veils an unbecoming aspiration after immortality unrelieved by an abiding conviction of the necessity and justice of making every effort to establish the results of another's investigations.

Many of the terms which have been proposed for genera of palæozoic fossils and have fallen into desuetude from the general belief that they are synonyms have a certain definite value; with the advance in our knowledge, and with the greatly augmented size of the generic groups with which we have to deal, many of these names must be revived in their original and strictest significance.

The pertinence of these remarks does not make itself so strikingly apparent in the group of trilobites termed ACIDASPIS, as in many other cases that might readily be indicated. We desire, however, to call attention briefly to the value of various terms which have been propounded for members of this group, expressing at the same time our conviction in regard to their respective values.

The name CERATOCEPHALA was proposed by John A. Warder in 1838,* for a fossil from Springfield, Ohio, well described and illustrated by him. The original specimen, which received the name of *Ceratocephala*

* American Journal of Science and Arts, vol. xxxiv, p. 377.

goniata, was a large cephalon of a trilobite with bases of conspicuous spines upon the occipital ring. That the author figured the specimen in an inverted position, and regarded the occipital spines as antennæ, does not in the least affect the value of this very appropriate generic term. Barrande* recognized the priority of Warder's description, and stated that the term would be entitled to adoption by palæontologists were it not that de Candolle had previously made use of the name *Ceratocephalus* for a genus of plants. Though the two words have the same origin, this fact need not at all affect the validity of both, more especially since they have been used in different departments of natural history, where there is not the slightest possibility of their being confounded. Furthermore, it has been stated by Captain Vogdes† that de Candolle's name is no longer recognized by botanists, but has been absorbed into the genus *Ranunculus*. If this be the case, it may serve to fortify the later term, though not materially, for it is perhaps more than likely that de Candolle's term will eventually be resuscitated with a restricted value. For us, however, the existence of de Candolle's term does not in the least affect the value of that of Warder, as the two words are different.

Prior to the use of term CERATOCEPHALA no distinctive name had been applied to these crustacea. Dalman‡ and Hisinger§ had mentioned them under the name PARADOXIDES; ACIDASPIS, Murchison, ODONTOPLEURA, Emmrich, POLYERES, Rouault, TRAPELOCERA, SELENOPELTIS, Corda, DICRANURUS, ACANTHOLOMA, Conrad, terms which have been applied to species of the same group, are all of later date. As a generic term in its broader sense, that is, in the meaning with which ACIDASPIS is now applied, CERATOCEPHALA, must take the precedence of all the rest.||

Conceding the prior right of this early American writer, we have still before us an interesting inquiry as to whether some of the names subsequently proposed have not a positive value as titles of subsidiary groups.

CERATOCEPHALA was founded on the species *C. goniata*, Warder, which, according to the author was found "in the same locality with the *Calymene Blumenbachii*, *bufo?* *phylactainoides*, and other rare

*Système Silurien, vol. 1, p. 693.

†Proceedings Academy Natural Sciences, Philadelphia, 1877.

‡Arsberät. om ny zool. arbet. och upptäckt. p. 135, 1828.

§Lethæa Svecica, p. 12, 1837.

|| The only writer who has urged the claims of Warder's term is Captain A. W. Vodges, in the paper already cited in the Proceedings of the Philadelphia Academy for 1877. ("Notes on the genera *Acidaspis*, *Odontopleura*, and *Ceratocephala*." In his recent valuable "Bibliography of Palæozoic Crustacea" (Bulletin No. 63, U. S. Geological Survey) Captain Vodges has, however, retained the name ACIDASPIS.

fossils;" in other words is a Niagara species. The name of this species has suffered the same obscurity as that of its genus, and has never been admitted to recognition. Barrande observed the close similarity of Warder's figure of *C. goniata* to his *Odontopleura* (1846) or *Acidaspis* (1852) *Verneuli*, and has represented on his plate 38 (fig. 3) a cephalon in a similar position to that given by Warder. For the purpose of comparison copies of both are here introduced. It will be observed that the size attained by these closely related animals is very large compared to that usually prevailing among members of "ACIDASPIS." Barrande's species is from a correlative horizon, his etage E₂. Professor Hall has described* a species from the Niagara limestone at Bridgeport near Chicago, *Acidaspis Danai*, with which the *A. Ida*, Winchell and Marcy,† is a synonym. The figures of this species given by Professor Hall show with sufficient clearness that this form is identical with *Ceratocephala goniata*, Warder.

In 1847 Corda described‡ the genus TRAPELOCERA, the first of five species being *T. rhabdophora*, Corda, which Barrande subsequently showed to be a synonym of his *Acidaspis Verneuli*. Whatever value this term might have had is therefore lost by its being in all respects synonymous with CERATOCEPHALA.

CERATOCEPHALA in its restricted sense has this positive value. It embraces such forms as agree with the type *C. goniata*, in having a large subquadrated cephalon, strong ridges running from the eyes along the outer branch of the facial suture to the anterior extremity of the glabella, and two strong, straight, divergent spines on the axis of the occipital ring. It will include *Acidaspis Verneuli* and *A. tremenda*, Barrande, *A. vesciculosa*, Beyrich, *A. bispinosa*, McCoy (not Emmrich), *A. Barrandii*, Fletcher and Salter; it is of quite restricted range and specific representation.

The name ACIDASPIS, proposed by Murchison in 1839,§ was founded on the species of *A. Brighti*, Murchison, the part described being the intra-sutural portion of a cephalon characterized by the sharp division of the lateral glabellar lobes and the broad occipital ring produced into a single stout median spine. Species of this type of structure

* Geology of Wisconsin, vol. 1, p. 432, 1862. See for illustration Twentieth Report, N. Y. State Cabinet, pl. 21, figs. 8, 9, 1867 and revised edition, 1870.

† Memoirs of the Boston Society of Natural History, vol. 1, p. 106, pl. 2, fig. 13, 1865.

‡ Prodrum einer Monographie der böhmischen Trilobiten, p. 158. This work, published over the names of Ignaz Hawle and A. J. C. Corda, has, since the publication by Barrande of a disclaimer by Hawle of any participation in its composition, been generally accredited to Corda alone.

§ Silurian System, p. 658.

are usually of small size and are widely distributed, having a very considerable vertical range from the lower Silurian into the middle or upper Devonian. They are subject to variation in some features, especially in the number and arrangement of the spines upon the pygidium, and in this respect afford no means of distinction from the members of other divisions of the genus CERATOCEPHALA.

In 1839 Emmrich proposed* the term ODONTOPLEURA, apparently not in ignorance of Murchison's term, but because he considered it insufficiently defined in being based upon a fragmentary specimen. He described and figured *Odontopleura ovata*, Emmrich, which must be taken as typical of his proposed genus. This species was afterwards refigured by him in 1845† under the name *O. bispinosa*. A highly finished figure of this species, was also given by Burmeister in 1843,‡ made, as it is stated, from the original specimen under the direction of the late H. Von Dechen,§ and from these figures it appears that the species is characterized by the great breadth of body, and by the occipital ring being smooth, or with a central tubercle, but without spines.

In 1840 Conrad described the species *Acidaspis tuberculatus*,|| a well-known form of the Lower Helderberg fauna, his description being based upon the intra-sutural portion of a cephalon. The species is strictly congeneric with *A. Brighti*, Murchison. At the same time he described without figure or specific designation a fossil to which he gave the name ACANTHOLOMA,¶ and it would appear both from his description and from the opinion expressed by Professor Hall in 1859** that the author had under consideration a free cheek of the same species of ACIDASPIS.

In the report for 1841, Conrad proposed †† the name DICRANURUS for a fossil there figured, also from the Lower Helderberg fauna. This form was mentioned in a list given on a preceding page of the same report as *Dicranurus hamatus* and under the name *Acidaspis hamata* it has become known as one of the peculiar species of this fauna. The

* De Trilobitis, p. 35, plate, fig. 3.

† "Ueber die Trilobiten," (Neues Jahrbuch für Mineralogie, etc).

‡ Organization der Trilobiten, pl. 2, fig. 11.

§ Burmeister states that this specimen in the Museum of the University of Berlin, was the only one known of the species, and Heidenhain in 1869 makes the same statement (Zeitschrift der deutschen geologischen Gesellschaft, vol. 21, p. 167).

|| Third Annual Report on the Palæontological Department of the Survey, p. 205, fig. 3 of the plate accompanying a few copies of the report for the following year. (See Fifteenth Report N. Y. State Cabinet.)

¶ In his report for the following year Conrad used the term *Acantholoma spinosa* in a list of fossils, but without further definition.

** Palæontology of New York, vol. 3, p. 370.

†† Page 48, plate, fig. 1.

species is not well known except from its cephalon which is notable for the extraordinary pair of curved spines originating upon the very broad occipital ring, making almost an entire revolution in a spiral outward curve and resembling a pair of grappling irons. Mr. Conrad regarded this fossil as the entire animal, describing it as without thoracic segments but with a tail prolonged into two great spines; hence the generic name, which is thus a misnomer, but can not be impeached on such a ground. But a single additional species of this well characterized group is known, the *Acidaspis monstrosa*, Barrande, from an equivalent horizon, the etage G. Fragments of the thorax known to belong to these species have been figured by both Hall and Barrande and they indicate structure similar to that of the Ceratocephalæ generally, straight pleuræ, prolonged into spines which are abruptly curved backward and greatly produced. Barrande also figures* a very incomplete pygidium which he surmises may belong to *A. monstrosa*, but it has a lichadiform structure and is totally unlike that figured by Professor Hall † in connection with a portion of the thorax of *A. hamata*. The original of the latter drawing is in the collection of the State Museum, but the pygidium, which had become detached and been gummed in place, has again become loosened and lost, a most regrettable circumstance as assiduous search in the Lower Helderberg rocks which has produced many fine specimens of this fossil has failed to discover another of the pygidium. We may, however, confide in the accuracy of the original representation of this part, in which the pygidium appears to have been of small size, semi-circular in outline, with a single projecting spine on each side near the anterior margin. The figures given on the accompanying plates of the American and Bohemian species will serve to indicate the distinctive characters of this group.

In the work of Corda's already cited (1847) the name SELENOPELTIS ‡ was proposed, and four species described, *S. Stephani*, *S. Buchi* (*Odontopleura Buchi*, Barrande, 1846), *S. Beyrichi*, and *S. Humboldti*. Barrande demonstrated in 1852 § that all the fossils thus described represented but one species, his *Acidaspis Buchi*. Corda's generic name was well defined and fully illustrated. This species *Acidaspis Buchi* is remarkable in many respects and we have reproduced Barrande's figure of the entire animal which is almost a copy of that

* Vol. 1, Supplement, pl. 15, fig. 3.

† Palæontology of New York, vol. 3, pl. 79, fig. 19.

‡ Page 34.

§ Page 746.

given by Corda. The median lobe of the glabella is small, the lateral lobes, instead of being more or less distinctly in two pairs, are confluent and exceedingly irregular; the occipital ring is devoid of spines or conspicuous tubercles and the long cheek spines take their origin above the genal angles and on the upper surface of the cheeks. The thoracic segments are very broad, each annulation bearing at its junction with the pleura a very strong node; the pleural ridges are not direct as in other species, but cross the entire width of the pleuræ obliquely from below upward and are there recurved into very long spines. The pygidium is described by both Corda and Barrande as without marginal spines and hence Corda's name. But Barrande has figured one very imperfect specimen retaining a single spine and in the figure, here copied, they were drawn in dotted lines. The cephalon is also without marginal spines. A comparison of these features with those of the other groups already indicated leaves no doubt that the single example of this type of structure stands well apart from its allies.

In the same year that Corda's "Prodrom" appeared (1847) the term POLYERES was used by Rouault* in a list of the palæozoic fossils found in the vicinity of Rennes, Brittany, for a trilobite which Barrande, after a personal inspection of the specimens, pronounced identical with his *Acidaspis Buchi*. Rouault's description of his genus was very brief. The essential character upon which it was based being the long thoracic spines. The single species mentioned, *Polyeres Dufrenoyi*, Rouault, was not figured. It must be admitted that from the original description alone of POLYERES it would be difficult to recognize its value, but the opinion expressed by Barrande fully determines its worth. As it is necessary to choose between the two terms SELENOPELTIS and POLYERES proposed the same year, it seems the wiser course to accept Corda's name, which was not only clearly defined but was also illustrated.†

It appears from the foregoing that many of the generic names which have been proposed for the trilobites known as ACIDASPIS, have a certain permanent value. If we admit these terms in a classification, the subdivision of the entire group of CERATOCEPHALA is found

* Bulletin de la Société géologique de France, 2 ser. vol. 4, p. 320. This paper was read at the session of December, 1846, and its date is thus quoted by both Barrande and Vogdes. The cover of these *feuilles* 20-25 bears the date of April, 1847.

† In spite of the serious indisposition toward Corda's work evinced by Barrande, a feeling which is explained by the circumstances connected with the appearance of this monograph, it becomes increasingly evident that it contains many kernels of good grain, though concealed among much chaff. The chaff has been sufficiently brought to the foreground. It is obligatory upon students of palæontology to lose sight of the personal differences of a passing generation and uphold the truths that this investigator was fortunate enough to elicit.

to be based to an important degree upon the structure of the occipital ring of the cephalon, whether it be smooth (or with a central tubercle), unispined, bispined, etc. The variations of this character, upon which the subdivisions CERATOCEPHALA (*sensu stricto* TRAPELOCERA), ACIDASPIS and ODONTOPLEURA depend, is not one of high morphological value, but it is not infrequently that variation in such minor details as this has proved of the greatest convenience in a subsidiary classification of the trilobites, for example, among the Phacopidæ and the Proetidæ. In the entire group of CERATOCEPHALA there is no more important variation in essential characters than that of the ankylosis of the cheeks with the cephalon in *Acidaspis Verneuil* and its allies, and the confluence of the lateral glabellar lobes in *A. Buchi*.

The usefulness of the subdivision proposed in the following lies primarily in the homogeneity of the groups and secondarily in the fact that it retains in their original value names of long standing.

SCHEME OF CLASSIFICATION.

Genus CERATOCEPHALA, Warder, 1838 :

Glabella with a long central lobe extending from near the anterior margin of the cephalon to the occipital ring; lateral lobes in two pairs, generally quite distinct from the central lobe. The facial sutures originate just within the genal angles, passing over the ocular nodes and cutting the frontal margin where their anterior terminations are separated by the width of the glabella; rarely obsolete from coalescence. Eyes small. Thoracic segments generally nine, sometimes ten; extremities of the pleuræ produced into spines. Pygidium with two or three annulations. Margins of cephalon and pygidium and surface of the test generally abundantly supplied with spines.

Type, *Ceratocephala goniata*, Warder.

1. Species having the occipital ring

(a) *Smooth or with a central tubercle.*

ODONTOPLEURA, Emmrich. Type, *O. ovata*, Emmrich.

(b) *With a single, large, straight, median spine.*

ACIDASPIS, Murchison. Type, *A. Brighti*, Murchison.

Synonym, *Acantholoma*, Conrad.

(c) *With two straight, divergent spines.*

CERATOCEPHALA, Warder, *sensu stricto*. Type, *C. goniata*, Warder.

Synonym, *Trapelocera*, Corda.

(d) *With two spirally recurved spines of great size.*

DICRANURUS, Conrad. Type, *D. hamatus* (Conrad), Hall.

2. Species with confluent glabellar lobes, oblique thoracic pleuræ and spineless pygidium.

(e) SELENOPELTIS, Corda. Type, *S. Buchi*, Barrande.

Synonym, *Polyeres*, Rouault.

To these it is necessary to add another to include an extravagant form known only from its pygidium, but whose relations are nearest to the genus CERATOCEPHALA:

(f) ANCYROPYGE, sub-gen. nov. Type, *Acidaspis Romingeri*, Hall.

(Palæontology of New York, vol. vii, p. 71, pl. 16 B, figs. 15-18, 1888).

Pygidium with a short, unsegmented, bullate axis, flanked on the lateral margins by two elongate nodes. Border broad and flattened, its margin bearing twelve long curved spines, four on each side and four behind; the lateral members strongly recurved, the posterior being straight and less divergent. From the surface of the posterior border arise two other spines just above and within the fourth of the lateral marginal spines; these rise at an angle of nearly 45° and were probably nearly of the same length as the rest.

The character of this remarkable trilobite will be seen from the accompanying copies of figures from the work above cited.

The felicity of this grouping makes itself apparent upon attempting an arrangement of the species. The more extravagant forms of CERATOCEPHALA are separated under the three divisions SELENOPELTIS, DICRANURUS and ANCYROPYGE and these are represented by but four known species in all. The actual morphological value of the latter is undoubtedly higher and they are better entitled to independence than the remaining groups.

THE AMERICAN SPECIES OF CERATOCEPHALA

In the palæozoic faunas of North America the genus CERATOCEPHALA is not largely represented.

It has been observed that the earliest species described is the *C. goniat*, Warder, 1838, with which, it seems to us, the *Acidaspis Danai*, Hall and *A. Ida*, Winchell and Marcy, are synonymous.

In a supplementary note to Warder's paper in the American Journal of Science, J. G. Anthony described the species *C. ceralepta*. The woodcuts accompanying this description represent two inverted pygidia of small size, the long marginal spines being regarded as antennæ. Mr. Meek subsequently identified, with some doubt, this species from the Hudson river group at Cincinnati, Ohio,* the original

*Palæontology of Ohio, Vol. I, p. 169, pl. 14, figs. 8, 9, 1873.

locality of Anthony's fossils, and gave figures of two pygidia which, for us, seem to establish the validity of Anthony's designation. At the same time Meek gave figures of two glabellas (*loc. cit.*, figs. 6, 7) without proposing therefor any specific name. Both are characterized by long single occipital spine, that of figure 6 very broad and stout, that of figure 7 much more slender. It appears that a cephalon having the structure of the former of these was subsequently described by S. A. Miller as *Acidaspis anchoralis** and with this cephalon Mr. Miller associated a pygidium having the same structure as that of *Ceratocephala ceralapta* as given by Anthony and Meek. From Miller's description it does not appear how forcible the reason may have been for including these separate parts under the same specific name, but should subsequent investigations prove that these parts referred to *Acidaspis anchoralis* do belong to the same species it would seem that Mr. Miller's name must take its place as synonymous for *C. ceralapta*, for Anthony's figures, though not all that could be desired, show a very characteristic feature in the single pair of long pygidial spines, which do not occur in any other of the known species of this fauna.

In 1842 Dr. John Locke described† the species *Ceraurus crossotus* from the same horizon at Cincinnati. Mr. Meek in the work cited (p. 165, pl. 14, figs. 10 a, b) made an identification of doubtful value (so regarded by him) of this form as a species of *ACIDASPIS*. It is questionable whether this should be accepted as the species intended by Locke and we prefer to refer to it provisionally as *Ceratocephala crossota*, Meek.

In 1847 Professor Hall described‡ *Acidaspis Trentonensis* and *A. spiniger*. The latter has proved to be a *Bathyurus*.

In 1885 Shumard described§ *Acidaspis Halli*, from the Trenton horizon of Missouri.

In 1857 Billings described|| *Acidaspis Horani* from the Trenton limestone, Rivière à la Friponne, near Cape Tourment. The original specimen is described as broken at the occipital ring so that its position in this classification is uncertain.

In 1873 Mr. Meek described¶ in addition to the species already mentioned, *Acidaspis Cincinnatiensis*, from the Hudson River group, the original being a pygidium with two thoracic segments attached.

*Cincinnati Quarterly Journal of Science, vol. 2, p. 349, figs. 2-4, 1875.

†American Journal of Science, 1st Ser., vol. 44, p. 347, fig.

‡Palæontology of New York, vol. I, p. 240, pl. 64, fig. 4, a-f; p. 241, pl. 64, fig. 5.

§ First and Second Report Geological Survey of Missouri, pt. 2, p. 200, pl. B, figs. 7, a-c.

|| Report to Sir W. E. Logan for 1856, p. 341.

¶ Palæontology of Ohio, vol. I, p. 167, pl. 14, fig. 3.

In 1875, S. A. Miller described from the Hudson River group, *Acidaspis anchoralis*, to which reference has been made, and *A. O'Nealli*.*

In 1876, Professor Hall referred to *Acidaspis* n. sp.? forms subsequently described as *Ceratolichas gryps*, Hall, † and *C. dracon*, Hall, ‡ from the Corniferous limestone of New York. At the same time he referred the species *Terataspis grandis*, Hall, and *Lichas Eriopsis*, Hall, to ACIDASPIS and indicated a pygidium of *L. Eriopsis* as *Acidaspis* (*Terataspis*) sp.? §

In 1879, Mr. C. D. Walcott described, || without illustration, *Acidaspis parvula* from the Trenton limestone of Trenton Falls, N. Y.

In 1879, Professor Hall described ¶ *Acidaspis fimbriata* from the Niagara group at Waldron, Indiana. The original specimen was a free cheek of which a figure was first given in 1883.**

In 1887, Mr. A. F. Foerste described †† the species *Acidaspis Ortoni* from the Clinton shales near new Carlisle, Ohio.

In the Palæontology of New York, Vol. VII, 1888, *Acidaspis callicera* was described, ‡‡ a species occurring in the Schoharie grit and Corniferous limestone of New York and Canada. A large pygidium was also referred to this genus but without specific name, |||| (Corniferous limestone, Cayuga, Ontario). Under the name *Acidaspis Romingeri*, was described ¶¶ the form which we have taken as a type of new subgenus, ANCYROPYGE, from the Hamilton fauna of Little Traverse Bay, Michigan.

These North American species arrange themselves under the proposed grouping as follows :

Genus CERATOCEPHALA, Warder, 1838.

CERATOCEPHALA, Warder, *sensu stricto*.

C. goniata, Warder, 1838.

Synonyms *Acidaspis Danai*, Hall, 1862.

A. Ida, Winchell and Marcy, 1865.

ACIDASPIS, Murchison, 1839.

A. anchoralis, Miller, 1875.

= ?? *A. ceralepta*, Anthony (sp.), 1838.

A. tuberculatus, Conrad, 1840.

* Cincinnati Quarterly Journal of Science, vol. 2. p. 86, fig. 9.

† Illustrations of Devonian Fossils, pl. 19, fig. 1.

‡ Idem, figs. 2, 3.

§ Idem, figs. 4-11, 12.

|| Thirty-first Report N. Y. State Museum (1879), advance sheets, p. 16.

¶ Description of New Species from the Niagara group, p. 20.

** Eleventh Report State Geologist of Indiana, pl. 33, fig. 11.

†† Bulletin Scientific Laboratories Denison University, vol. 2, p. 90, pl. 8, fig. 1.

‡‡ P. 69, pl. 16 B, figs 1-13.

|||| Pl. 16 B, fig. 14.

¶¶ P. 71, pl. 16 B, figs. 15-18.

ODONTOPLEURA, Emrich, 1839.

- O. Trentonensis*, Hall (sp.), 1847.
- O. parvula*, Walcott (sp.), 1877.
- O. Halli*, Shumard (sp.), 1855.
- O. crossota* (Locke?), Meek (sp.), 1873.
- O. O'Nealli*, Miller (sp.) 1875.
- O. Ortoni*, Foerste (sp.), 1887.
- O. callicera*, Hall (sp.), 1888.

DICRANURUS, Conrad, 1841.

- D. hamatus*, Conrad, 1841.

ANCYROPYGE, Clarke, 1891.

- A. Romingeri*, Hall (sp.), 1888.

Species unclassified:

- ? *Ceratocephala ceralepta*, Anthony, 1873.
- C. Cincinnatiensis*, Meek (sp.), 1873.
- C. Horani*, Billings (sp.), 1857.
- C. fimbriata*, Hall (sp.), 1879.

EXPLANATION OF PLATE I.

CERATOCEPHALA GONIATA, *Warder.*

Fig. 1. Copy of the original figure. From *American Journal of Science and Arts*, vol. xxxiv, No. 2, p. 378.

ACIDASPIS VERNEULLI, *Barrande.*

Fig. 2. Outline copy of a cephalon viewed from in front as in the preceding figure. *Barrande, Système Silurien du Centre de la Bohême*, vol. I, pl. 38, fig. 3.

Fig. 3. The entire individual. *Barrande, loc. cit.*, fig. 5.

TRAPELOCERA HOERNESI, *Corda.*

Fig. 4. Copy of the original figure. *Corda, Prodrôme Einer Monographie der böhmischen Trilobiten*, pl. vii, fig. 79a.

DICRANURUS HAMATUS, *Conrad.*

Fig. 5. Copy of the original figure given on the reproduction of the original plate (Fifteenth Rept. N. Y. State Museum), designed to accompany Mr. Conrad's report for 1841.

Fig. 6. A figure from a cephalon retaining all the parts except the free cheeks. From the trilobitic layers of the Delthyris Shaly limestone at Slingerland's, near Clarksville, N. Y.

Fig. 7. The pygidium and a portion of the thorax as given in *Palaontology of New York*, vol. iii, pl. 79, fig. 19.

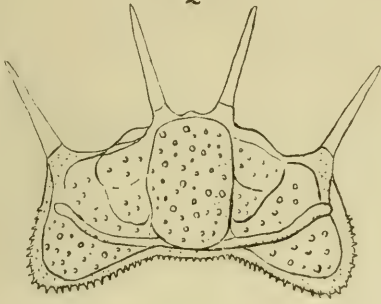
ACIDASPIS MONSTROSA, *Barrande.*

Fig. 8. A specimen showing a portion of the thorax. From *Barrande op. cit.*, Suppl. pl. 15, fig. 1.

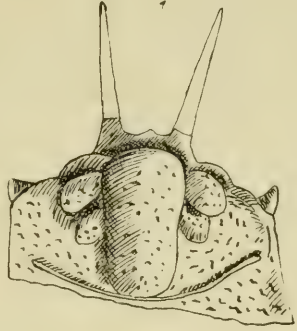
ACIDASPIS BRIGHTI, *Murchison.*

Fig. 9. Copy of the original figure in *Murchison's Siluria*, p. 261, fig. 8.

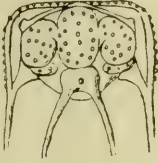
2



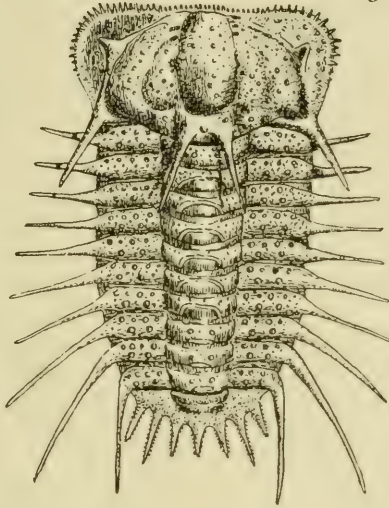
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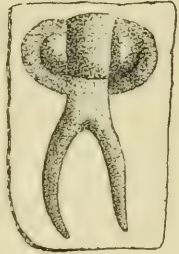
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3



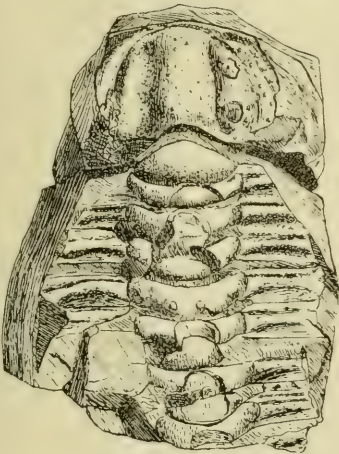
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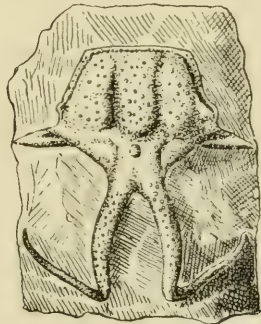
7



8



6



EXPLANATION OF PLATE II.

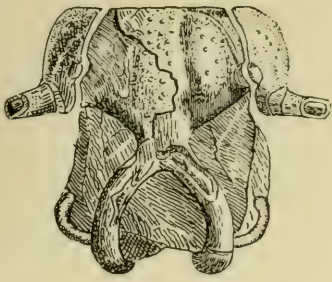
ACIDASPIS MONSTROSA, *Barrande*.

Figs. 1, 2. Front and profile of a cephalon retaining the detachable cheeks.
From Barrande, *op. cit.*, Supplement, pl. 11, figs. 19, 20.

ACIDASPIS ROMINGERI, *Hall*.

Figs. 3, 4. Outline figures of the original specimen, copied from Palæontology of New York, vol. vii, pl. 16b, figs. 15, 16.

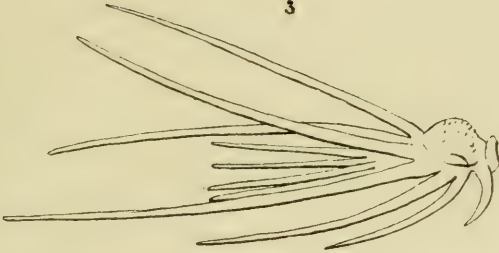
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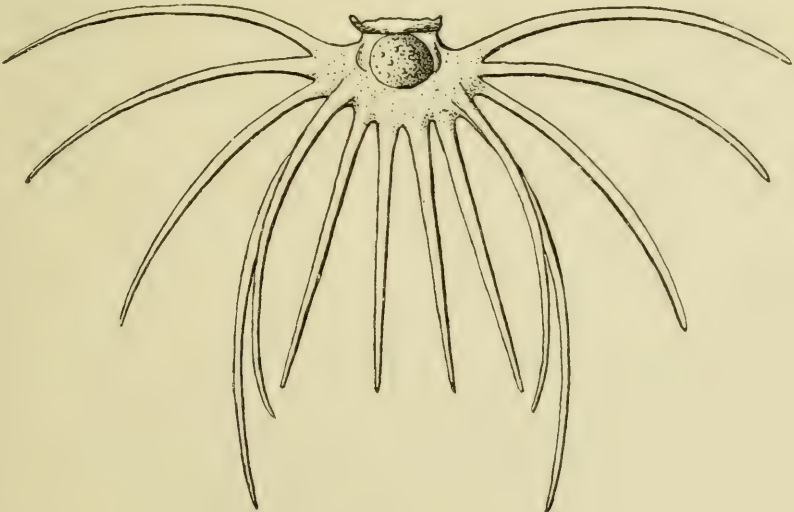
2



3



4



EXPLANATION OF PLATE III.

ODONTOPLEURA OVATA, *Emmrich*.

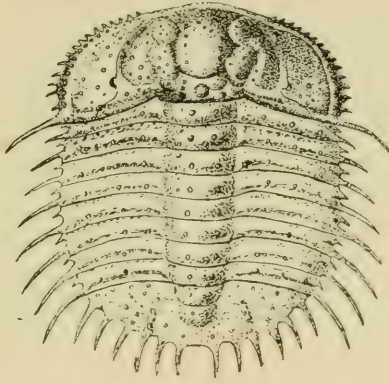
Fig. 1. Copy of the figure given by Burmeister, *Organization der Trilobiten*, pl. 2, fig. 11.

ACIDASPIS BUCHI, *Barrande*.

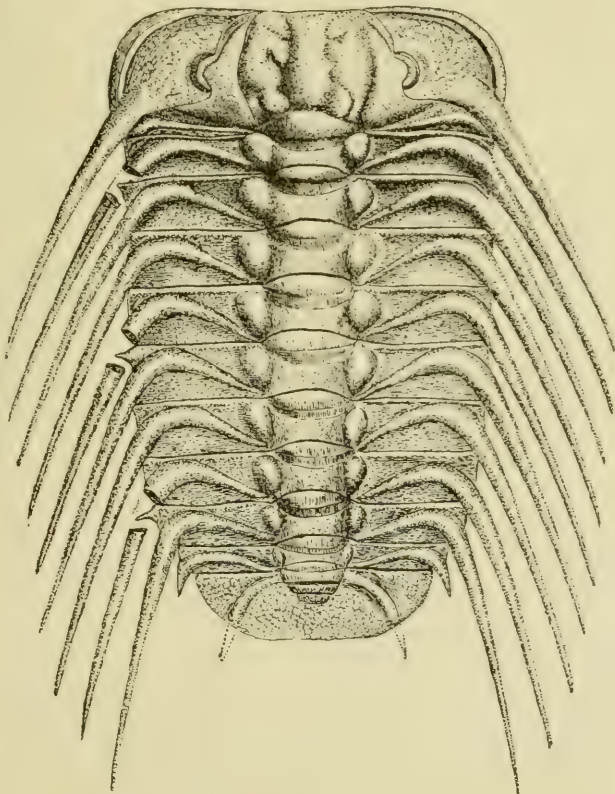
(SELENOPELTIS STEPHANI, *Corda*.)

Fig. 2. An entire individual; after Barrande, *op. cit.*, pl. 37, fig. 25.

1



2

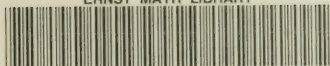






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